UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,532	07/28/2006	Matthew Bruce	US040117US	4274

28159 7590 01/25/2010

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
Briarcliff Manor, NY 10510-8001

EXAMINER	
NGUYEN, HIEN NGOC	
ART UNIT	PAPER NUMBER
3768	
MAIL DATE	DELIVERY MODE
01/25/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/597,532	BRUCE ET AL.	
	Examiner	Art Unit	
	HIEN NGUYEN	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *11-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07/28/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This action is in response to the Argument filed 09/292009.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Brock-Fisher et al. (US 2003/0204142).

3. Addressing claim 1, Brock-Fisher discloses a method of ultrasonically imaging blood perfusion and blood flow comprising: acquiring a sequence of ultrasonic echo signals from a body which has been infused with an ultrasonic contrast agent (see abstract and [0011-0014]); processing the echo signals to detect the tissue structure in the absence of microbubbles (see abstract and [0011-0014]); processing a plurality of the echo signals in a first way to detect echo signals returned from tissue microvasculature perfuse with the contrast agent (see [0011-0014], [0037], and [0084], processing moving tissue with contrast agent using B-mode is the first way); processing a plurality of the echo signals in a second way to detect echoes returned from blood flow containing the contrast agent in larger vessels; (see [0011-0014], [0075] and [0078], processing blood flow containing the contrast agent with color-flow is the second

way); utilizing the echo signals processed the first way to form a portion of an image depicting perfusion (see [0030-0039], especially [0037]); utilizing the echo signals processed the second way to form a portion of an image depicting blood flow in larger vessels (see [0030-0039], [0075] and [0078]) and displaying an ultrasound image depicting both contrast-enhanced perfusion and contrast-enhanced blood flow; (see [0011-0014] and [0030-0039]).

4. Addressing claims 2-7 and 9 Brock-Fisher discloses depicting both the presence and locations of microbubbles in tissue and the velocity of microbubbles in blood flow (see [0012], the detected ultrasound echo signals provide the locations and velocity of microbubbles in the blood. From these echo signals operator display the location and velocity of the microbubbles in the blood); deciding the portion of the image which an echo signal is to form on the basis of a blood flow velocity estimation (see [0003-0005] and [0011-0014]); deciding the portion of the image which an echo signal is to form on the basis of a blood flow variance estimation (see [0011-0014], [0075] and [0078], Image is formed from the detect echo signals. These signals are detected using Doppler mode. Doppler mode determines the blood flow variance estimation from the echo signals and forms an image base on this variance estimation); processing a plurality of echo signals in first and second ways comprises processing the same ensemble of echo signals in first and second ways (see abstract, [0011-0014], [0037], [0075] and [0078]); acquiring an ensemble of echoes over time from each of a plurality of different locations in the body (see abstract, Fig. 9 and [0011-0014]); processing a plurality of the echo signals in a first way comprises detecting the amplitude or power of the echo

signals (see [0037], [0044], [0049] and [0051]) and wherein processing a plurality of the echo signals in a second way comprises Doppler processing the plurality of the echo signals (see [0075] and [0078]); utilizing the echo signals processed the first way further comprises forming a perfusion image and wherein utilizing the echo signals processed the second way further comprises forming a flow image and displaying an ultrasound image further comprises displaying the perfusion image overlaid with the flow image (see [0003-0005], [0011-0014], [0030-0039], [0075] and [0078]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brock-Fisher et al. (US 2003/0204142) and in view of Burns et al. (US 6,095,980).

Brock-Fisher does not detect nonlinear components of the echo signals by the pulse inversion technique. Burns discloses detecting nonlinear components of the echo signals by the pulse inversion technique to be more effective in separating overlap fundamental and harmonic energy (see col. 1, lines 5-23 and 55-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Brock-Fisher's method to detect nonlinear components of the echo signals by the pulse inversion technique as taught by Burns because this technique is more effective in

separating overlap fundamental and harmonic energy and produce a higher quality image.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brock-Fisher et al. (US 2003/0204142), in view of Burns et al. (US 6,095,980) and further in view of Bruce et al. (US 6,620,103).

Brock-Fisher discloses transmitting a plurality of differently modulated transmit pulses (see [0012]). However, he does not disclose transmitting differently modulated pulses in each of a plurality of different beam directions and detecting harmonic components of the echo signals by the pulse inversion technique. Bruce discloses transmitting differently modulated pulses in each of a plurality of different beam directions (see abstract, claims 19 and 23). Burns discloses detecting nonlinear components of the echo signals by the pulse inversion technique to be more effective in separating overlap fundamental and harmonic energy; (see col. 1, lines 5-23 and 55-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Brock-Fisher's method to transmit differently modulated pulses in each of a plurality of different beam directions and detect nonlinear components of the echo signals by the pulse inversion technique as taught by Bruce and Burns in order to acquire echoes which could be combined to separate harmonic frequencies by pulse inversion. Further, pulse inversion technique is more effective in separating overlap fundamental and harmonic energy and produces a higher quality image.

Response to Arguments

8. Applicant's arguments filed 09/29/2009 have been fully considered but they are not persuasive. Applicant argues Brock-Fisher does not disclose any way to distinguish or segment tissue perfusion from larger vessel blood. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the two types of blood flow are classified and segmented using two parameters, velocity variance and echo signal power) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding claim 8, applicant argues Burns does not concern with segmenting microvasculature perfusion from larger vessel blood flow. Applicant's argument is not persuasive because examiner relies on Burn for teaching of detecting nonlinear components of the echo signals by the pulse inversion technique.

Regarding claim 10, applicant argues Bruce does not concern with segmenting contrast perfusion of tissue microvasculature from flowing contrast in larger vessels. Applicant's argument is not persuasive because the examiner relies on Bruce for the teaching of transmitting differently modulated pulses in each of a plurality of different beam directions.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HIEN NGUYEN whose telephone number is (571)270-7031. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. N./
Examiner, Art Unit 3768

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768